VIVEKA KULHARIA

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EDUCATION

University of Oxford, UK *October 2017 - April 2022*
DPhil in Computer Vision
Supervisors: Professor Philip H.S. Torr, Dr. Puneet K. Dokania
Information Engineering, Department of Engineering Science

Indian Institute of Technology Kanpur, India *July 2012 - July 2016*
Bachelor Of Technology GPA: 9.1/10
Department of Computer Science and Engineering

RESEARCH INTERESTS

Computer Vision, Diffusion models, Generative AI

RELEVANT EXPERIENCE

Moonvalley, Seattle, USA April 2025 - Present
Member of Technical Staff

· Research Engineer on the Data Intelligence team behind Marey, a state-of-the-art video generation model that surpassed OpenAIs Sora 1 (T2V) at launch
· Ownership of end-to-end video data quality assessment, including metadata validation and correction by efficiently processing millions of videos using optimized GPU and CPU pipelines
· Designed, implemented, and deployed state-of-the-art video understanding model
· Lead the synthetic data post-processing pipeline and contributed to post-training dataset creation to improve model performance

Cruise LLC, Seattle, USA October 2022 - April 2025
Senior Applied Scientist

· Work spanned simulation data, generative AI, critical machine learning models for perception (Blog)
· Improved perception model edge case handling (recall improved by $> 30\%$) by building end-to-end synthetic/real-to-real training data generation pipeline. Models deployed across two different sensor systems for self-driving perception
· Led the technical effort and cross-team alignment to integrate Generative AI into the perception stack
· Proficiently utilized state-of-the-art generative methods like Diffusion models (paper) and GANs to enhance perception system robustness

Huawei Technologies, Helsinki, Finland May 2022 - September 2022
Senior Computer Vision Researcher, Cloud R&D

· Delivered production-ready neural network for similar image search on petalsearch.com
· Led data preparation, benchmarked different neural networks to decide the candidate for our task, created tools for very fast evaluations, coordinated with internal and external team members for project goal alignment, helped deliver the trained neural network for deployment

Niantic Research, London May 2021 - August 2021

Research & Development Intern with Dr. Eric Brachmann, Dr. Aron Monszpart, Dr. Sara Vicente, Dr. Guillermo Garcia-Hernando, and Prof. Gabriel J. Brostow

· Developed novel neural network architecture for 3D scene understanding to target augmented reality
· Created specialized dataset to support the research objectives

Amazon Lab 126, Sunnyvale, California June 2019 - September 2019

Applied Scientist Intern with Dr. Siddhartha Chandra, Dr. Amit Agrawal, and Dr. Ambrish Tyagi

· Developed state-of-the-art weakly supervised image segmentation method, accepted in ECCV 2020

Visual Computing Group, TUM, Munich June 2017 - August 2017

Research Intern advised by Prof. Matthias Niessner

· Created a model to predict coarse 3D shape and colors of an object given its single-viewpoint image
· Rendered images and created voxel data from available meshes using MLib
· Worked on getting finer and diverse predictions

Microsoft Research India June 2016 - May 2017

Research Fellow with Dr. Sundararajan Sellamanickam

· Worked on Cloud Services Modeling. Designed anomaly detection models for multi-variate time-series
· Explored MRF based approach to compare time-series of different types based on unusual characteristics
· Created recommender system for Office application

Xerox Research Centre India May 2015 - July 2015

Research Intern advised by Dr. Narayanan Unny

· Explored lasso regression to get interpretable Sparse model for a high feature dataset
· Created a novel method to estimate missing values under constraints

Monet Networks Inc. May 2014-July 2014

Intern advised by Dr. Anurag Bist, CEO

· Understood the existing Facial Expression Recognition API and its usage. Worked on backend to capture and store video using existing WebRTC APIs
· Developed specific metrics on non-verbal cue analytics for content rating

PUBLICATIONS

1. **GenMM: Geometrically and Temporally Consistent Multimodal Data Generation for Video and LiDAR**
   Bharat Singh*, **Viveka Kulharia***, Luyu Yang*, Avinash Ravichandran, Ambrish Tyagi, Ashish Shrivastava
   Preprint arXiv:2406.10722, 2024

2. **Can neural networks count digit frequency?**
   Padmaksh Khandelwal, **Viveka Kulharia**
   Journal of Student Research, 2023

3. **Calibrating Deep Neural Networks using Focal Loss**
   Jishnu Mukhoti*, **Viveka Kulharia***, Amartya Sanyal, Stuart Golodetz, Philip H. S. Torr, Puneet K. Dokania
   NeurIPS 2020

4. **Box2Seg: Attention Weighted Loss and Discriminative Feature Learning for Weakly Supervised Segmentation**
   Viveka Kulharia*, Siddhartha Chandra*, Amit Agrawal, Philip Torr, Ambrish Tyagi
   ECCV 2020

5. **On using Focal Loss for Neural Network Calibration**
   Jishnu Mukhoti*, **Viveka Kulharia***, Amartya Sanyal, Stuart Golodetz, Philip H.S. Torr, Puneet K. Dokania
   ICML 2020 workshop on Uncertainty and Robustness in Deep Learning (UDL) as **'Spotlight'**: top 10% of accepted papers

6. **A Revised Generative Evaluation of Visual Dialogue**
   Daniela Massiceti, **Viveka Kulharia**, Puneet K. Dokania, N. Siddharth, Philip H. S. Torr
   Preprint arXiv:2004.09272, 2020

7. **Domain Partitioning Network**
   Botos Csaba, Adnane Boukhayma, **Viveka Kulharia**, András Horváth, Philip H. S. Torr
   Preprint arXiv:1902.08134, 2019

8. **Multi-Agent Diverse Generative Adversarial Networks**
   Arnab Ghosh*, **Viveka Kulharia***, Vinay Namboodiri, Philip H.S. Torr, Puneet K. Dokania
   CVPR 2018 as 'Spotlight paper'

9. **Similarity Learning for Dense Label Transfer**
   Mohammad Najafi*, **Viveka Kulharia***, Ajanthan Thalaiyasingam, Philip H. S. Torr
   CVPR 2018 workshop on The 2018 DAVIS Challenge on Interactive Video Object Segmentation - **'Second place'**

10. **Contextual RNN-GANs for Abstract Reasoning Diagram Generation**
    Viveka Kulharia*, Arnab Ghosh*, Amitabha Mukerjee, Vinay Namboodiri, Mohit Bansal
    AAAI 2017 as poster, **NIPS 2016** workshop on Adversarial Training

11. **Message Passing Multi-Agent GANs**
    Arnab Ghosh*, **Viveka Kulharia***, Vinay Namboodiri
    Preprint arXiv:1612.01294, 2016

PATENTS

1. **Segmentation using attention-weighted loss and discriminative feature learning**
   Ambrish Tyagi, Siddhartha Chandra, Amit Kumar Agrawal, Viveka Kulharia
   US Patent 11,450,008

PROFESSIONAL SERVICE

Reviewer: CVPR (2022-25), ECCV (2022), NeurIPS (2021-22), BMVC (2020, 2025), TPAMI (2020-21), L3D-IVU CVPR2023 workshop, Pre-registration Experiment (NeurIPS workshop (2020-21) and special edition of PMLR 2021)

TALKS

2024	Guest lecture on Diffusion models and GenAI at Plaksha University in May
2020	Presented Calibration work at NeurIPS 2020 in December
2020	Presented Box2Seg work at Multidisciplinary University Research Initiatives (MURI) in December
2020	Talk on Box2Seg work at Five AI, Cambridge in October
2020	Presented Box2Seg work at ECCV 2020 in August
2018	'Understanding and reconstructing scenes' talk at MURI in Boston, US in September
2018	Spotlight talk on MAD-GAN work at CVPR-18 at Salt Lake City, US in June
2018	Talk on MAD-GAN work at the University of Adelaide, Australia in February
2017	Discussed MAD-GAN work on Dataskeptic podcast in May
2017	Guest lecture on GANs in course CS 698O: Visual Recognition at IIT Kanpur in April

OTHER ACHIEVEMENTS

2018	Won the best poster prize at PAISS - AI summer school in Grenoble, awarded 350 euros
2018	Second position in CVPR-18 DAVIS Challenge on Interactive VOS, awarded Adobe creative license.
2018	Funding from NAVER Labs to attend Prairie AI Summer School (PAISS) in Inria Grenoble, France
2018	Awarded Light Senior Scholarship for the academic year 2018-19 by St Catherine's College, Oxford
2018	Travel grant for Robotics Vision Summer School (RVSS) in Kioloa, Australia
2017	Selected for PhD at University of Oxford funded by Toyota Research Institute
2016	Travel grant for NUS Workshop on Contemporary Research in Computer Science and Information Systems 2016, Singapore
2016	Selected for "Xerox Open 2016", Bangalore
2015	Got 13th position out of 702 registered teams in coding contest OPC-Pravega, Codechef.com
2014	Developed programs for Microchip controller dsPIC33FJ256GP710 at Lohia Corp Ltd.
2014	Developed Monopoly strategy game for windows 8 pc in Microsoft Appathon
2014	Academic Excellence Award by IIT Kanpur for the academic year 2012-13
2013	Got Yellow Belt in Taekwondo, IIT Kanpur
2012	Got 2nd Place, Basketball, overall among all 1st year students organized by CPA, IIT Kanpur
2012	All India Rank 254 in IIT-JEE among 5.6 lakh students
2008	Secured All India Rank 1, KVS Junior Mathematics Olympiad

TEACHING EXPERIENCE

- **British Physics Olympiad (BPhO) Marker**: Helped Department of Physics, University of Oxford in marking BPhO Round 1 copies in 2017.

- **Mentor, Machine Learning: Tools, techniques, applications (CS 771):** Conducted doubt sessions, helped setting assignment problems and post their solutions in the graduate level course of around 200 students under the guidance of Prof. Harish Karnick in 2016.

- **Teaching Assistant, Data Structure and Algorithms (ESO 207):** Helped setting assignments and exam problems, post their solutions, grade assignments, invigilate exams and set doubt remedy hours in the course of around 300 students under the guidance of Prof. Shashank K Mehta in 2015.

- **Mentor, Fundamentals of Computing (ESC 101):** Mentored 6 students in the course that deals with programming in C under the guidance of Prof. Raghunath Tewari in 2014.

SKILLS

- Computer Vision • Deep Learning • Machine Learning
- Diffusion Models • GANs
- Python • PyTorch • Tensorflow • C • C++
- SQL • Shell Script • LaTeX